

REMARKS

Consideration of new claims 22-40 is requested.

CLAIM STATUS

Claims 1-21 were originally presented. Most of these claims were subject to a restriction requirement and were withdrawn from consideration on their merits by the Examiner over the objection of applicants. They received no substantive examination. The new claims have been drafted to avoid this. There are only two independent claims now presented. The difference is that a first set of claims, claims 22-31, are directed to the embodiment where the RF IC chip is mounted on top of the digital IC chip, and a second set of claims, claims 32-40, are directed to the embodiment where the digital IC chip is mounted on the RF IC chip.

BACKGROUND

A brief summary of the invention as claimed will be given. The invention is a stacked MCM package in which both RF and digital MCMs are stacked on top of one another. The I/Os in the RF MCM are isolated from the digital MCM by routing dedicated RF I/O interconnections straight through the digital MCM, without any electrical connections to the digital MCM. In that sense these I/O interconnections are passive with respect to the digital MCM substrate, and are isolated from all electrical interconnections to the digital MCM. That is the essence of the invention. It is claimed in every claim of the application. The concept is illustrated in Figs. 6 and 7.

In previous Office actions, claims were rejected as unpatentable over Hultmark

et al. The Hultmark et al. patent shows a stacked IC chip arrangement where all the IC chips are digital. This neither presents the problems addressed by applicants' invention or makes obvious the claimed RF MCM/digital MCM stacked combination. Stacked chip arrangements where all chips are digital are known. The suggestion that since applicants show RF and digital IC modules mounted side by side on a substrate this makes obvious the stacking of RF and digital IC devices, or that the Hultmark et al. patent makes that obvious, even though Hultmark et al. never mention RF devices, is at the heart of the issue. That is the essence of the invention. Stacking RF and digital MCMs has been avoided in the prior art because of the difficulties described in applicants' specification. Since applicants have taught how to solve those problems, and therefore how to implement a stack of RF and digital modules, it would seem to follow that a claim to that arrangement is both novel and patentable.

The claims now presented clearly specify that the stacked IC chips, i.e. the digital MCM and the RF MCM are not electrically connected. Note the following passage from the Hultmark et al. patent (col. 4, lines 34-38):

"FIG. 2B is a side view of a stacked chip assembly comprising a larger chip electrically connected to an intermediate chip, which intermediate chip is electrically connected to another chip."

Claims previously presented were rejected as unpatentable over applicants' admitted prior art in view of Akram et al. and further in view of Vendramin. The relevance of applicants' prior art has just been discussed. The Akram et al. patent shows a stack of devices which resembles closely the digital MCMs shown in Figs. 3 and 4. The Akram et al. patent never mentions RF devices. So the Akram et al. patent

discloses no more than what was shown as background in applicants' specification. As such it is simply cumulative. There is no real combination of references since both show the same thing, i.e. a single digital MCM.

Moreover, the Akram et al. patent lacks any suggestion that one stacked device is electrically isolated from another. Note the following passage from the Akram et al. patent (col. 3, line 50 et seq.):

"The substrates are preferably stacked atop one another by electric connections which are ball or column-like structures. Alternately, solder bumps or balls may be formed on the substrate. The electric connections achieve electric communication between the stacked substrates."

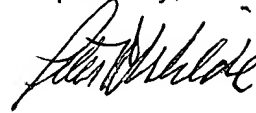
The Vendramin patent describes Faraday cage structure for RF devices. There is no justifiable reason to combine the Vendramin patent with the Akram et al patent because a Faraday cage in the Akram et al. device would serve no function useful to Akram et al. It is only if some of the devices are RF devices and some of the devices are digital devices, with one stacked on the other, that any such combination could be considered proper or relevant. But that is not the case. The only such teaching that exists in the record is applicants'.

Accordingly it is believed that new claims 22-40 distinguish from the cited references and define patentable subject matter. Allowance of these claims is requested.

In the event that the Examiner concludes that a telephone call would advance the prosecution of this application, the Examiner is invited and encouraged to call the

undersigned attorney at Area Code 757-258-9018.

Respectfully,

A handwritten signature in black ink, appearing to read "Peter V.D. Wilde", written in a cursive style.

Peter V.D. Wilde
Reg. No. 19658

Date: JUN 25 2003
Law Firm of Peter V.D. Wilde
301 East Landing
Williamsburg, VA 23185